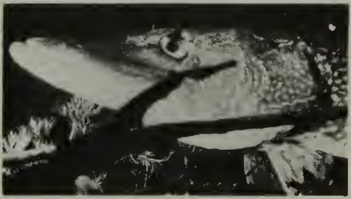
Ontario

fish and wildlife

Review

Vol. 17, No. 2, 1978

The price of fish and wildlife resources is vigilance. For example: the rescue of an endangered fish population at Big Chute, reported first hand by Allan Emery and Murray Townes.



Murray writes a tribute to the late Mont Richardson whose work illuminates our cover (pumpkinseed) and four pages.

Questions and Answers. George Spangler and Al Berst explain the splake in perspective. Dianne Kolenosky explains the perspective on Lake Ontario anglers.

Do they or don't they? Robert Wenting whets our curiosity with an account of woodcock behavior.

Ontario
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The goal of the Ministry of Natural Resources is to provide opportunities for outdoor recreation and resource development for the continuous social and economic benefit of the people of Ontario, and to administer, protect and conserve public lands and waters.

Ministry of
Natural
Resources
Ontario

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EDITORIAL

Paying for past neglect

It was a sad day for many anglers back in the late 1960s when they learned some of their prize game fish were tainted with contaminants.

For the past few years, warnings have been issued by the Ministry of the Environment that women of childbearing age and children under 15 years of age should not eat contaminated fish. Printed guidelines have recommended the amount that may be eaten by other persons. We now have to stop and think before we eat the fish we have caught.

Social and economic effects have been devastating where serious contamination has occurred and fishing has been prohibited. In one way or another, our disregard for the environment catches up with us.

But the picture isn't as bleak as some believe.

Mercury, DDT, Mirex and PCBs have never been detected in sufficient amounts to make any of our waters unsafe for swimming or as a source of treated drinking water. The testing of 30,000 sport fish from 440 Ontario lakes and rivers has shown that fish from many popular angling waters are free from contamination. Out of 260 lakes and rivers tested in 1977, all fish species of all sizes from 40 of these waters were found to be safe for unrestricted consumption.

Very few waters in Ontario are so badly contaminated that none of their fish should be eaten by anyone. In almost all our lakes and rivers, some of the fish are edible.

The fish have told us what is wrong with our waterways and now it is up to us to do something about it. Just because there is a serious contaminant problem does not mean we should give up fish management until all waters are cleaned up.

Those who criticize fish stocking programs, and advocate the abandonment of fish communities in problem lakes, are forgetting three points. First, we should build up and maintain native fish communities in a balanced state because if we don't achieve this stability now our later attempts to resurrect it may prove futile. Second, neglecting our more sensitive game fish in contaminated lakes may result in their disappearance and the loss of a gene pool distinctive to that lake or watershed. Third, anglers don't have to eat their fish to enjoy fishing.

The Ministry of Natural Resources is co-operating in an international program to clean up the Great Lakes. Already much success has been achieved in reducing the phosphorus content of some waters. And the fight to control industrial contaminants is gaining momentum.

But let us be realistic. Just turning off the tap won't make the contaminants disappear overnight. They are in the sediments and the aquatic plants and animals.

But remember, all of society is to blame for the contaminants in our air, soils, waters, vegetables, fruits, and fish. If society has the will to clean up its mess, it will take time, patience and money.

INTROSPECT

A personal opinion
not necessarily endorsed by
the Ministry of Natural Resources

Emotion vs Evolution

by R. M. Alison
Waterfowl Biologist, Wildlife Branch

At the present stage of endangered species programs on this continent, one wonders if wildlife agencies ought to be involved in attempts to stall or reverse the evolutionary process while coincidentally preaching adherence to sound biological principles in their management programs.

The basic philosophical distinction which must be made is whether man should be considered as part of, or apart from, the process of evolution.

If we choose to exclude man, then the endangered species programs assume a more significant role in the management of wildlife since we will be free to operate as if human nature and man's activities can be turned off and on at will.

But such is not the case. Man will continue to warp the environment, to rape and pillage the landscape, and to pollute and despoil the earth in a manner consistent with his sordid performance over the past 10,000 years.

Therefore, wildlife agencies should not operate in defiance of truth but accept the fact that man is indeed an integral part of the evolutionary procedure—whether the resulting effects on wildlife are emotionally pleasing or not.

The extinction of a species, because its last representatives cannot adapt to environmental change, is a normal occurrence. It has been universally recognized among scientists that species which can adapt to change (whether of human causation or otherwise) enjoy a certain selective advantage over species which cannot adapt.

It is disconcerting that we seek to nullify that sound precept by artificially stimulating the persistent survival of species that have demonstrated inferior adaptive talent and have therefore suffered numerically, vanishing from places they should not inhabit. We have assumed omnipotence and omniscience and accepted the notion that we are capable of discouraging, slowing or even reversing the evolutionary machine merely because we are personally disposed to do so.

The passing of a species is a deeply regrettable happening. The regret is a very personal thing and anthropomorphic in the worst sense since neither the vanished species nor any other component of the environment, except man, mourns the passage.

Possibly the sole positive support for endangered species programs is emotional in nature. We do not wish to see a species vanish because we selfishly want to benefit from its existence and not because it merits existence in an evolutionary context.

I need only recall the condemnation which wildlife agencies have traditionally expressed against emotional arguments in such classic instances as the anti-hunting and anti-trapping campaigns. We cannot afford inconsistency. Either we despise feeling as a criterion for decision making or we enlist its support. We cannot discredit the appeal of an emotional argument one day and enlist emotional support the next for a program we favor.

I am emotionally in favor of endangered species programs but logically I must stand opposed.

Maintaining communications

The Ministry of Natural Resources maintained 9,023 km of forest access roads, managed 24,000 km of canoe routes and kept up 1,400 water access points on public land in the 1977-8 fiscal year. A total of $500,000 was made available in grants to clubs and agencies to improve the grooming on 13,000 km of snowmobile and ski trails.

Four out of five hunters are trained

A total of 560,834 hunting licences was sold to Ontario residents and 29,095 to non-residents in 1977. A total of 32,126 new hunters was trained in 1977, bringing to 452,298 the number of hunters trained in Ontario since the hunter safety training program began in 1957.

A 3.4 kg (7½ lbs) splake taken by angling.—Photo by Al Berst (See back cover)

Questions and answers on splake

by G. R. Spangler and A. H. Berst
Research Scientists, Fisheries Research Section, Fisheries Branch

MANY fishermen in Ontario are curious about the status of splake. Some of the basic questions relate to the very nature of the hybrid, itself. How can splake be identified?Are they good game fish? Do they exhibit hybrid vigour? Can they reproduce? Where did splake come from?

Splake have been produced since the 1870s by various fish culturists in North America. Interest in the hybrid was renewed in the early 1950s as a result of the disastrous decline in lake trout populations caused by the sea lamprey. An international program was devised to control sea lamprey populations in the upper Great Lakes and then to restore the complex of self-reproducing lake trout stocks or to establish a suitable substitute for them.

To achieve the latter objective, the lake states and Ontario organized a massive program to rear and plant young lake trout under the aegis of the Great Lakes Fishery Commission. At that time it was recognized that lamprey control might not be successful enough to permit sufficient lake trout to survive the nine or more years thought to be needed to establish substantial spawning populations. The Commission's Special Committee on Lake Trout Rehabilitation recommended in 1958 that Ontario's splake work be accelerated to provide ''an early maturing, fast growing trout able to inhabit the strata formerly occupied by the native trout . . .''.

Thus, splake and lake trout represented alternative solutions to the problem of rehabilitating deep-water trout stocks. The choice between the two was to be made on the basis of performance, splake being expected to fare better in the face of persistent lamprey predation. There was, of course, no way of knowing how effective sea lamprey control would be, or of anticipating the performance of either fish short of trying both and observing the results. It was decided by the Commission to use lake trout in the rehabilitation of Lakes Superior and Michigan and splake, at least initially, in dealing with Lake Huron.

Research to develop an early-maturing lake trout by hybridization with brook trout, and by selection of each generation, began in 1957. By 1966, the selection program had provided the initial brood stocks to production hatcheries. The first progeny of these were planted in Lake Huron in 1969 and plantings have continued annually. Results of the splake plantings have been monitored by the Lake Huron research and assessment units and have been regularly reported to the Great Lakes Fishery Commission, the Ontario Ministry of Natural Resources and the scientific community.

Just what is a splake? It is a cross between the speckled trout (brook trout) and the lake trout and its name is taken from both species. An earlier name, wendigo, is no longer in use.

Geneticists refer to the progeny of the first cross as the F_1 generation. The hybrids are fertile, so an F_1 male may be crossed to an F_1 female to produce the second generation known as F_2 splake. This process may be repeated indefinitely, giving rise to F_3, F_4, F_5 splake, and all possible combinations of crosses such as $F_2 \times F_5$. It is also possible to breed splake back to either parent species. Progeny of these crosses are called ''backcrosses''.

What advantages are possible with hybridization? Experience in horticulture and animal husbandry has demonstrated that hybrid plants and animals are frequently more vigorous and resistant to disease than the parental species. At the same time, they possess many of the most desirable traits of the parents. Geneticists produce hybrids which possess a broader range of genetic material than is offered by either of the parents. Selective breeding may then be applied to develop strains of animals with specific characteristics.

What do we hope to achieve by breeding splake?

Modern fisheries management has to deal simultaneously with the increasing demands of an expanding human population and its attendant impact on the environment. Environments have been degraded by various forms of pollution, land-use practices and the accidental and deliberate introduction of exotic species. Water-quality deterioration in the lower Great Lakes and the introduction of smelt, alewives and sea lampreys contributed to the decline and extinction of our most valuable salmonid fisheries.

Ten years of planting experience with lake trout in South Bay of Lake Huron demonstrated that lake trout simply did not survive to maturity at prevailing levels of sea lamprey predation. This pointed out the need for an early-maturing trout which could spawn before being killed by lamprey and which could use the deep-water forage fish available in the Great Lakes. Splake were created to meet this need.

In addition to the Great Lakes rehabilitation objectives, research has indicated that certain strains of splake can be bred to increase the production of many inland lakes which are only marginally suitable for brook trout and lake trout.

What objectives have we achieved in the selective breeding of splake?

Fertility has always been a major concern in the breeding of hybrids. Genetic experiments have shown that the F_1 generation is less fertile than either of the parent species, but the successive generations, e.g. F_2, F_3, F_4, are comparable in fertility to lake trout or brook trout.

The question also arises as to whether or not hybrid stocks will revert after several generations to one or the other of the parent species. Geneticists now know that the splake is a stable hybrid which will not revert to the parental species. This stability allows the breeder to develop strains of splake to fit specific environmental conditions.

Selective breeding of splake has been successful in two important respects. First, they mature at age 3 or younger like the speckled trout; this is four to five years earlier than lake trout. Second, they occupy deep water; the latter characteristic is similar to that of lake trout which differ from speckled trout in their ability to retain swimbladder gas.

Experience with the selected strain in both Canadian and U.S. waters of Lake Huron has shown that sexual maturity occurs about two years earlier than anticipated. There is some evidence that early maturity may be related to a shorter life span. To reduce the possibility of seriously shortening the life span of the hybrids, additional lake trout genes (the longer-lived parent species) have been bred into the Ontario stock by crossing selected splake males back to lake trout females. This is roughly the equivalent of providing a splake which is ¾ lake trout and ¼ brook trout. The offspring are called lake trout backcrosses.

In body form and color, the hybrids show varying degrees of intermediacy between the

Tanker truck unloading splake for planting, 1973.—Photo by Bob Payne

Splake rearing pond at Chatsworth hatchery.—Photo by Al Berst parents. Coloration is greatly affected by age, sex, season and environment. Splake from inland lakes are highly colored compared to those from the Great Lakes which are usually silvery. As in brook trout, males tend to be more highly colored than females, with leading edges of the paired fins and the anal fin striped with white. Splake tend to be heavier for their length than lake trout but slimmer than brook trout. Depth of the tail fork varies but is generally intermediate between the deep fork of the lake trout and the nearly "square" tail of the brook trout.

How do splake compare to the parental trout in their field performance?

In Lake Huron, where a wide variety of food items is available, F_1 hybrids, selected splake and backcrosses feed on invertebrates and small fish during their first summer in the lake and subsequently become almost entirely piscivorous. In inland lakes in instances where forage fish are not available, the hybrids feed upon invertebrates, especially crayfish, leeches and insects.

The various strains of splake hybrids grow more rapidly than either of the parental species. F_1 splake, backcrosses and selected splake in Lake Huron attain a fork length of approximately 44 cm and a weight of 1,100 g by age 3. In comparison, lake trout of similar age achieve a length of approximately 38 cm and a weight of 600 g. In inland waters, growth of the hybrids is slightly slower than in Lake Huron but F_1 splake and lake trout backcrosses still achieve lengths and weights significantly greater than lake trout of the same ages.

It is not known what the maximum size or age will be for the various strains of splake, but F_1 splake and selected splake are known to have survived in natural waters beyond age 7. The largest F_1 reported from Ontario waters is a 7.5 kg (16¾ lbs) specimen from northern Lake Huron. A 4.8 kg (10¾ lbs) selected splake was taken in 1974 from southern Lake Huron.

Dual plantings of splake and brook trout in Algonquin Provincial Park have shown that F_1 splake yield a greater return to the creel than brook trout in some lakes which have traditionally been managed for brook trout. Matched plantings of F_1 hybrids, lake trout backcrosses, brook trout backcrosses and the trout parental species in lakes of northeastern Ontario have clearly shown both greater survival and greater yield of the various hybrids compared to the parental species.

Selected splake and lake trout backcrosses in South Bay occupy depths ranging from 0 to 50 m and temperatures from 4 to 20°C during the summer. Concentrations of these fish occur at depths of 20 to 30 m and temperatures of 10 to 15°C. Lake trout in these waters occupy a narrower range of depths (20 to 40 m) and temperatures (4 to 15°C) and tend to concentrate at 35 m and 10 to 12°C. F_1 splake concentrate at depths of 14 to 22 m and temperatures of 10 to 16°C.

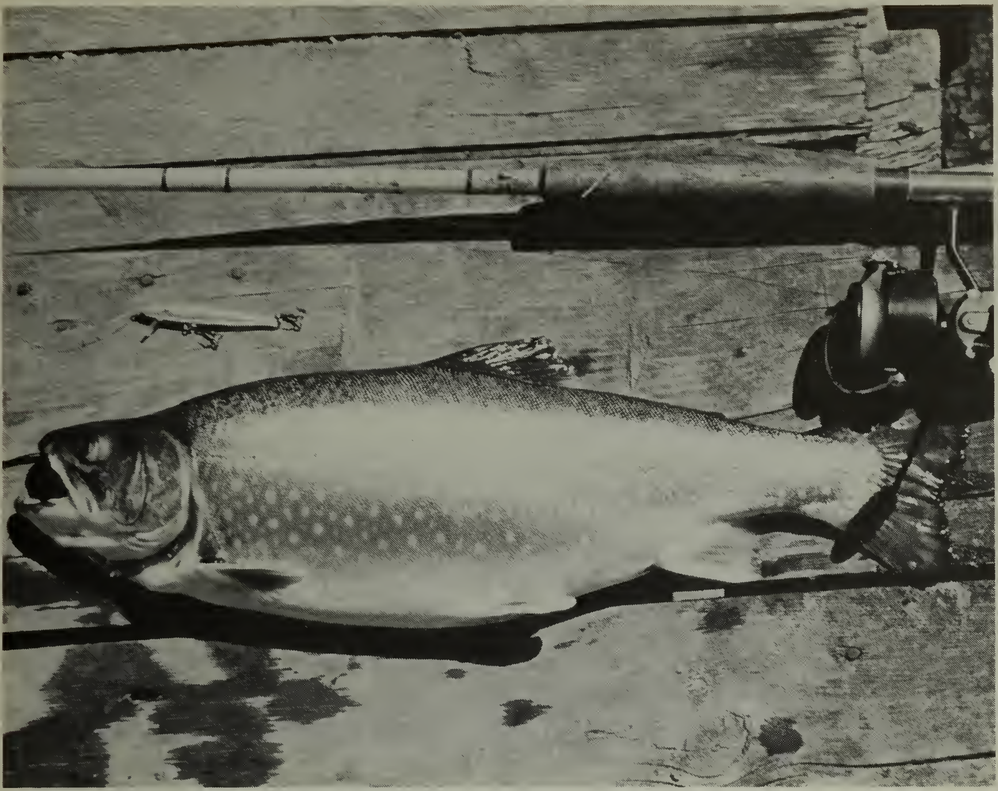
Sexual maturity is attained by age 3 in the majority of F_1 hybrids. In selected splake, all of the hybrids mature by age 3 or earlier. The onset of maturity in lake trout backcrosses occurs at age three. In comparison, sexual maturity in the lake trout usually occurs by age 6 to 8 while most brook trout are mature at age 3.

Spawning of splake in Great Lakes and inland waters of central Ontario occurs from mid-October to mid-November. In comparison, the spawning season of various stocks of lake trout in the upper Great Lakes is variable and spawning may occur in any month from June through December. In inland lakes of central Ontario, lake trout generally spawn during the last half of October. Brook trout in the same area may spawn from the end of September to the middle of December.

Splake have been observed to spawn over a variety of materials including fine and coarse gravel, broken rock and boulders, at depths from 1 to 5 m. They spawn during day and night in contrast to lake trout which are nocturnal and brook trout which are daytime spawners.

Hybrid stocks exhibit a mixture of courtship and spawning behavior which includes some features common to each of the parental species. Spawning can occur either between pairs of fish or in a milling assemblage of several males and a single female. Areas of the bottom are swept clean of debris by the female prior to egg deposition. Incubation of the eggs occurs over winter and the young fry emerge from the spawning shoal following spring break-up.

First-generation (F_1) splake are known to have established self-sustaining populations in Agnes Lake, Alberta, which was stocked in 1951. The original hybrids planted in this



A 2.9 kg splake of three years taken at Owen Sound.—Photo by Jon George

lake were produced by crossing female brook trout and male lake trout. The reciprocal cross, i.e. female lake trout × male brook trout, has also been used to establish a self-sustaining population of splake in Lake 17, Espanola District, Ontario. Ripe specimens of both sexes in F_1 hybrids, lake trout backcrosses and selected splake have been captured from a variety of locations in Lake Huron but to date there is only limited evidence of successful natural reproduction.

Is the splake a good game fish?

The splake is an excellent game fish. When hooked it sometimes exhibits the dashing, twisting battle of the brook trout and occasionally reveals its lake trout heritage through a dogged and deep water struggle. Splake are generally available to sport fishing over much of the year. Successful ice fishing for splake has occurred in the Lion's Head and Meaford areas of Georgian Bay and Algonquin Park lakes. Casting or trolling near shore, shortly after ice-out, has been a productive method wherever splake occur. In late summer and early fall, surf casting and bait fishing have been effective near river mouths in Lake Huron.

As table fare, splake are delicious whether baked, broiled, pan-fried or smoked. The color, texture and flavor of the hybrids is more intense from inland lakes than from the Great Lakes. It is comparable in these characteristics to the brook trout parent.

Do splake provide a valid alternative for rehabilitation of the once productive trout waters of Lake Huron? Why have we not attempted to re-establish lake trout?

Lake trout research was the earliest activity of the South Bay laboratory, dating back to 1947. It was clearly demonstrated that sea lamprey predation eliminated lake trout before they attained sexual maturity, thereby cutting off natural reproduction of the species.

Sea lamprey populations have been brought under a significant degree of control since 1970 and it is now possible to reintroduce lake trout to Lake Huron. This will not necessarily ensure the re-establishment of self-reproducing populations of lake trout. Large plantings in Lake Michigan have demonstrated good survival and growth and many of these lake trout have spawned repeatedly, but with little evidence of survival of the offspring.

In Lake Superior, rehabilitation of lake trout stocks has been much slower than expected. This has been the case in spite of earlier stocking (beginning in the 1950s), effective chemical lamprey control (beginning in 1958) and the fact that native lake trout were never exterminated there.

Lake trout have also been planted in recent years in Michigan waters of Lake Huron, and this should afford an opportunity to determine whether lake trout will establish self-reproducing populations. At present, a comparison is under way in South Bay to determine through a dual planting experiment whether lake trout backcrosses might offer a significant advantage over lake trout.

Although the above alternatives for rehabilitation are clear enough, only time will tell which (if any) is viable. Wherever possible we have tried not to close off options towards plantings of any lake trout or trout-derived stocks which may, in the long run, provide a valuable fishery for the people of Ontario.

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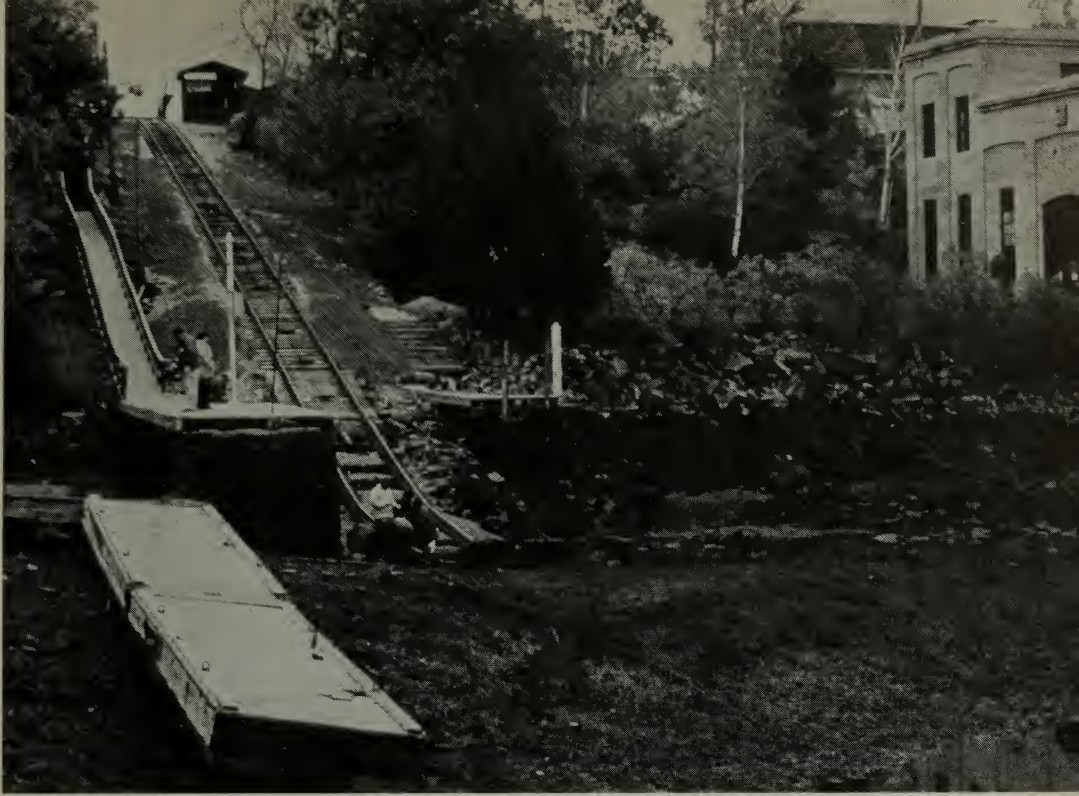
Bear tragedy

Most of our readers already know of the tragic bear incident that took the lives of three boys in Algonquin Provincial Park on May 13 . . . We will probably never know the reason for the attack but there are some valid comments to be made on this incident, nevertheless. To begin with, it should be viewed as a ''once in a million'' occurrence. Attacks on humans by black bears are so rare (even by females guarding cubs) that we are in much greater danger of being struck by lightning. In Algonquin, for example, bears are common and millions of people have camped here since the park was created in 1893, but this is the only time there has been any inter-action resulting in a human fatality. In other words, there is no reason to be terrified of encountering a bear . . . The truth is that bears are wild animals; their normal reaction to humans is one of fear and when this is overcome (usually by intentional or unintentional baiting with food by humans), the results are almost always unpleasant. The normal outcome is that the bear becomes such a persistent nuisance that it must be destroyed. This alone should cause anyone who values parks and wildlife to refrain from wilfully feeding bears or unintentionally attracting them by improper disposal of garbage.

—The Raven, Algonquin Provincial Park



The marine railway at Big Chute after basin was drained.—Photos by Mrs. Alan Emery

Big Chute fish rescue

by A. R. Emery, *Icthyologist, Royal Ontario Museum*
and M. A. Townes, *Conservation Officer, Huronia District*

THE lower reaches of the Severn River carry large numbers of pleasure boaters from Georgian Bay and attract numerous anglers who pursue the local walleye, bass and panfish.

A fish rescue became necessary at Big Chute when the needs of the boaters led to construction which would temporarily alter the fishes' habitat and probably kill most of the fish. Big Chute is located north of Coldwater and west of Severn Falls in the northwest corner of Matchedash Township.

At Big Chute was an interesting example of man's technology—a marine railway, a device still in use in some parts of Europe but rare in North America. Its purpose is to transport boats on a flatbed railcar from one height of river to another. The Big Chute railway, just upstream from the entrance to Gloucester Pool in the Severn River, was built before 1920 and was still using the original tracks and one of the original cars.

As modern pocketbooks get fatter, pleasure boats get larger. Many cruisers now draw well in excess of one metre and the old railcar could not accommodate them. It could take only one large boat at a time and this sometimes resulted in long delays for water travellers. The federal Department of Transport capitulated to pressure from boat owners to build a much larger marine railway.

Also located on the site is a small hydroelectric generating station which supplies most of the electricity in the local area. The dam and turbine complex on the Big Chute rapids was built in 1910 and is little changed from its original construction. A small basin, about 700 feet across, receives the rush of water from the three large turbines. The basin in the Severn River constricts to a narrow sluiceway and then widens again before entering Gloucester Pool.

The downstream footing of the new marine railway is located at the bottom of this basin. Since underwater construction is difficult and expensive, the contractor decided to empty the basin and build the footings on the dry river bed. The first step was to build a coffer dam (temporary dirt dam) downstream from the hydro dam. This meant diverting the river flow through Six Mile Lake and a small nearby stream and shutting down the hydro station.

Of particular interest to the authors and Butch LaFrance, fisheries technician, was the fact that many large walleye and channel catfish congregate in the downstream currents. We made arrangements with the contracting company to assist us to remove the fish and release them safely in Gloucester Pool behind the coffer dam.

The coffer dam was to be completed within hours of closing the hydro dam but its construction was delayed several days. When finished it leaked badly, allowing large quantities of heavy clay back into the pool. At the same time, the company was emptying the pool with four large pumps which seemed to labor tremendously and were frequently clogged with silt.

Our task was to get the fish out of the pond safely and prevent poaching. As the water level went down, great numbers of crayfish were left exposed to wander, clicking, after the water, or to try vainly to hide under boulders in the damp sand. Many small fish, unfamiliar to anglers, were also left stranded.

When the water had dropped about five metres, we decided the time had come to run the first seine through the water. As we unrolled the net, a number of curious onlookers gathered to watch. Butch LaFrance took the deep end of the net and began the sweep. When the net came up and was brought to shore, there was a titter from the spectators. Instead of huge walleyes and channel catfish, we had netted several thousand tiny crappies and minnows. The onlookers were not impressed but we were pleased to see the fish were still healthy and breathing easily.

By the second day, the water level had lowered to within three metres of the deepest area of the old river bed. Overnight the backwash under the coffer dam had added a huge load of mud to the water, turning it a milky grey.

When we pulled the seine up this time, the condition of the fish was distressing. The rock bass were blanched and gasping; darters gaped from the stress of the silt load and net haul. We knew the time had come to make our major move.

We launched our boat and put the large seine into action. The first haul was full of channel catfish, pike and gar. Indeed the net was too full and we had to release some of the fish. When the fish-box was full of fish, it weighed about 180 kg. To move it to the coffer dam, we commandeered the services of the constructors' large power crane. It rumbled slowly over to our box, swung it into the air and placed it gently on the dam. We then emptied the fish into the clear water downstream.

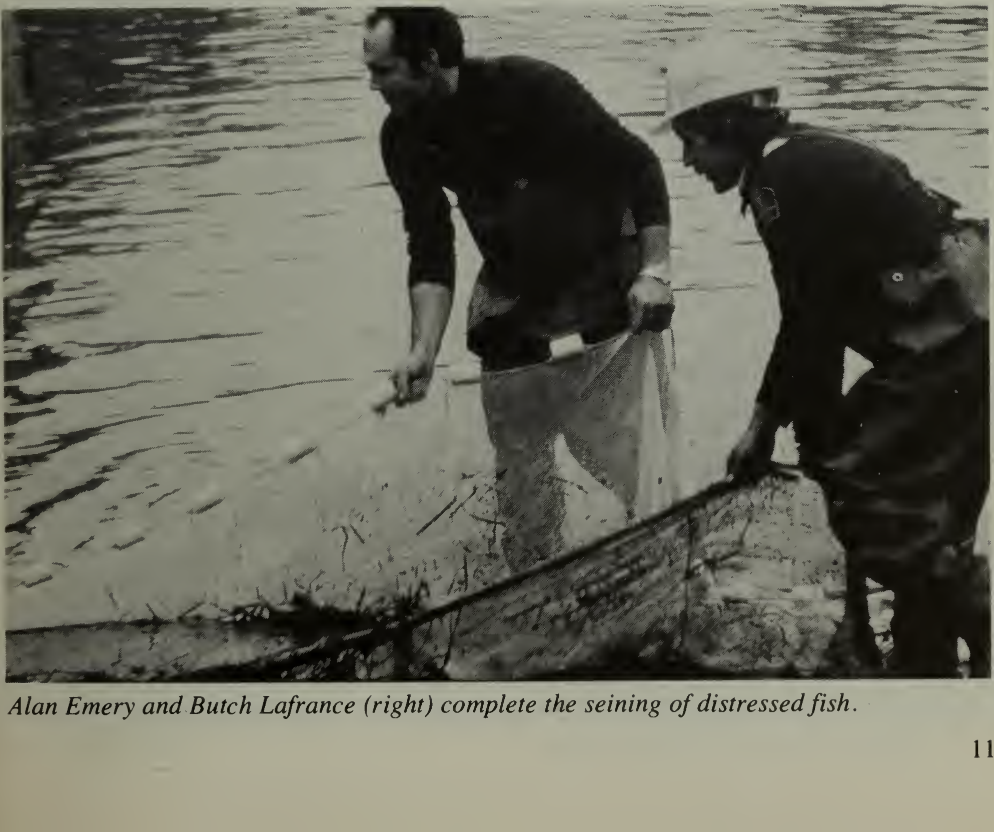
After a series of net hauls and what seemed to be an unending stream of channel catfish, the nets were coming up nearly empty. We did not see a single walleye. Presumably the walleye had become uneasy when the current ceased to flow and had escaped through the coffer dam opening which the construction people found so difficult to close.

We captured the following species in the nets: Iowa darter, *Etheostoma exile;* Johnny darter, *Etheostoma nigrum;* log perch, *Percina caprodes;* long ear sunfish, *Lepomis megalotis;* brown bullhead, *Ictalurus nebulosus;* channel catfish, *Ictalurus punctatus;* black crappie, *Pomoxis nigromaculatus;* rock bass, *Ambloplites rupestris;* pumpkinseed, *Lepomis gibbosus;* pike, *Esox lucius;* smallmouth black bass, *Micropterus dolomieui;* and one large example of the primitive longnose gar, *Lepisosteus osseus.*

Except for representative samples of some of the smaller species which were preserved for the fish collection at the Royal Ontario Museum, all of the netted fish were released successfully. We had moved in quickly enough to rescue most of the fish before conditions became intolerable. Many thousands of fish were transferred to the safety of Gloucester Pool.

We hope that many of the rescued fish will return to the rushing torrent under the hydro dam to tantalize, frustrate and reward the many anglers who try their luck below the Big Chute.

Authors Townes and Emery (right) check the depth of the dwindling pool.



Alan Emery and Butch Lafrance (right) complete the seining of distressed fish.

THE UNDERWATER PHOTOG

Blacknose dace, Wilmot Creek.

Pickerel weed, Mc

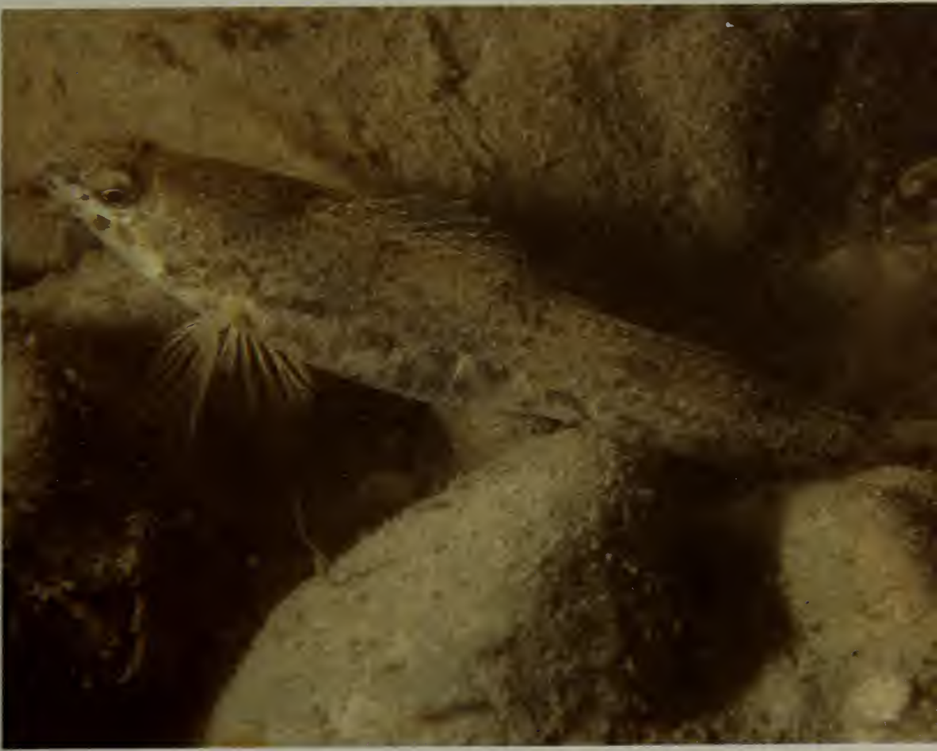
Rainbow trout parr, Wilmot Creek.

Male white sucker in

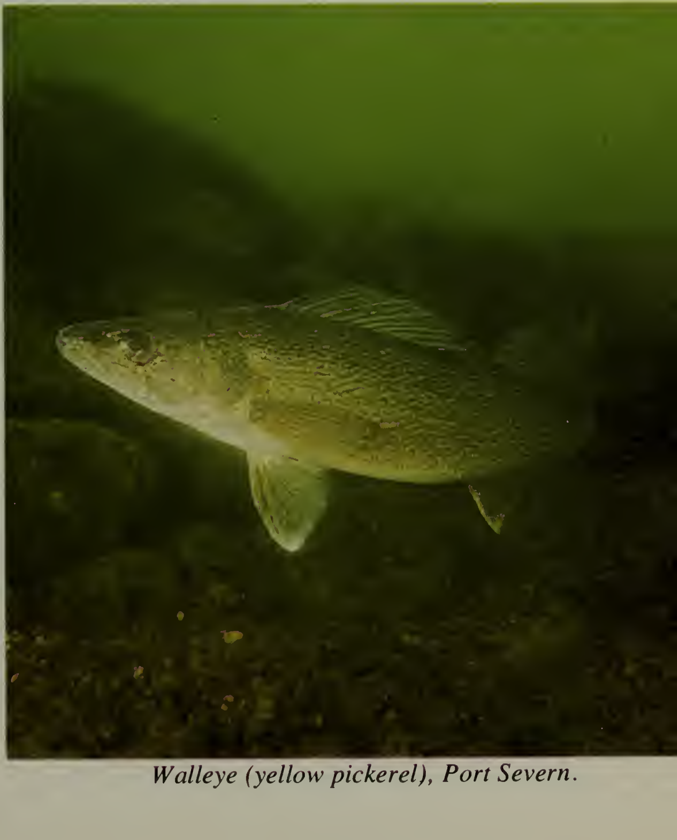
PHY OF MONT RICHARDSON

River.

Johnny darter, Wilmot Creek.



g colors, Nogies Creek.



Walleye (yellow pickerel), Port Severn.

Mont Richardson, conservationist and photographer, in his element.—Photo by Dave Laine

Mont Richardson

A tribute by Murray Townes

When Mont Richardson died on October 4, 1977, we all lost an ardent conservationist who was deeply interested in underwater ecology and I lost my diving buddy, instructor and close friend.

Mont was born in Barrie in 1927. He lost his left forearm to gangrene at an early age but despite this handicap he became an accomplished swimmer, carpenter and photographer. He became an active diver 20 years ago and, after several seasons diving among the wrecks in Georgian Bay, he became interested in underwater photography and aquatic ecology.

I first met Mont at Sibbald Point Provincial Park when the pike were spawning. He was standing in the swamp, where the pike were active, and I thought I had caught a poacher. I went out to apprehend him and found Mont getting the pike to pose for his camera. This was the start of a long and rewarding friendship during which he taught me to dive and do underwater photography. We spent many happy hours examining pickerel and lake trout spawning beds and rearing areas.

Mont was extremely interested in our Ministry and was always eager to assist in any project we had under way. He assisted in surveying and photographing the pickerel spawning beds at Port Severn (previously reported in Volume 15, Number 3-4) and photographed lake trout spawning shoals in Lake Simcoe for the Lake Simcoe Fisheries Assessment Unit.

As his slide collection grew, he put together slide shows for interested groups, most of the time at his own expense. Sometimes this meant travelling from Toronto to as far as Six Mile Lake Provincial Park. Some of his slides are in the collection of the Ichthyology Department of the Royal Ontario Museum, and others have appeared in

Northern pike, Lake Simcoe. *—Photo by Mont Richardson*

Rock bass, quarry at St. Marys. *—Photo by Mont Richardson*

Young largemouth bass, Port Severn. *—Photo by Mont Richardson*

Log perch, Port Severn. *—Photo by Mont Richardson*

natural history publications.

Over the years Mont conducted regular diving courses at the University of Toronto's Hart House. He was always ready and willing to assist people interested in diving and underwater photography.

Mont and I were diving together as late as ten days before his untimely death. He was enthusiastically planning some fall photography and was discussing a spawning bed survey we had planned for this summer.

Mont was a founding member of the Littoral Society of Toronto, a group of divers and photographers who held him in high esteem.

The Ontario Underwater Council has sponsored the Mont Richardson Memorial Trophy and will award it annually for the best photograph of the year taken in freshwater anywhere in the world.

Woodcock with chick in flight.
—Drawing by Robert A. Hubert

Would a woodcock if a woodcock could?

by R. J. Wenting, *Biologist, Aylmer District*
and D. A. Fieseler, *Biologist, Long Point Bird Observatory*

I HAVE often seen woodcock going down to the swamps in the evening carrying their young . . . Indeed it is most evident that the young would inevitably perish if left in a dry heathery wood unless the old ones managed to carry them to some more favourable ground . . .

So wrote Charles St. John, a Scottish naturalist, who in 1849 was the first person to report the woodcock's singular habit of transporting its young.

William Sheldon (1967) cites several reliable reports of this behavior in both the American woodcock, *Philohela minor,* and the European woodcock, *Scolopax rusticola.* Such reports usually appeared as letters to magazines or notes in periodicals.

Although the behavior has been reported a number of times, the reports have not been supported with tangible evidence such as photographs. Many people who have worked extensively with woodcock, and never seen a bird carrying its young, still question the authenticity of these reports.

The reports indicate that the woodcock flies with the chick held between its legs, sometimes using its bill for further support. Some authorities believe such reports are mistaken observations of the ''decoy flight'' of a brooding hen, which consists of labored flight with tail depressed and legs hanging—the feigning of injury. Once the threat is lured away, the female will return to the hidden young.

Others have suggested the sightings were of the ''accidental'' carrying of a chick that had been clutching the female's legs during brooding. Among European authorities, ''carrying'' by the European woodcock finds greater acceptance.

In her review of the literature since 1940, Monica Shorten (1974) has cited several reports of woodcock seen carrying several chicks, one after another, from the nest site.

John Couch, a Montreal area hunter, witnessed this repetitive behaviour and reported his observations to the Canadian Wildlife Service as follows:

''The following observations may be of interest to you. As you may or may not know there has been a controversy in Britain which has gone on for a very long time regarding the subject of an adult woodcock picking up her (or its) young when threatened by man or dogs. It has been argued since the time of Colonel Hawker . . .

''In the spring of 1971, the field trials for pointers and Britany spaniels was held at El

A woodcock chick.

Rancho Gun Club, just south of Montreal. This was held in May. The day following the trials, in which quail, imported from the States, were used, I took my two labradors and spaniel down to give them a work out. During the afternoon the dogs became very keen on scent in a hedgerow. An adult woodcock flushed and flew, portrayed a broken wing and landed, thus drawing the dogs. It ran, discreetly flew again, returned from the open field to where it was originally flushed. It then mounted a young bird and flew, carrying it between its legs to a hedgerow on the far side of the field. It then returned again and did exactly the same thing with another young bird . . . End of controversy as far as I am concerned.''

Robert A. Hubert, a naturalist and hunter of St. Thomas, reported the following to the Aylmer District Office in 1977:

''On the morning of June 9, I was walking through a low-lying area which earlier in the year was under about eight inches of water but had since dried up. In this moist area, fresh signs of woodcock were apparent. It was from this area a woodcock flushed laboriously, not with the erratic flight it is noted for.

''I had time to observe the bird with my binoculars as it flew parallel with the contour of the hill and valley. The bird was still within 100 feet when I noticed it was carrying a young chick securely between its thighs. As I watched, it soon disappeared out of view into a willow thicket. I did not pursue it further.''

Collingwood Ingram, writing on the European woodcock in *Ibis* in 1978, indicated his belief that the species exhibits a morphology and anatomy adapted to carrying young which evolved ''not for an occasional removal of a nestling from danger, but as an habitual part of the species' parental behavior.

"Prominent among these adaptations is the conspicuous hypertrophy of a woodcock's leg muscles. Also notable are the backward position of its legs and the extensive area of their muscular attachment to the distal or lumbar regions of the bird's body, both of which features would naturally give stability and strength to the bird's thigh-grip of the nestling it is carrying. The woodcock's strongly developed tendons, the large size of the muscles surrounding the tibia and its relatively short tarsi (average length only 38 mm) suggest that these organs play an important part in the carriage of the nestling, not only by supporting some of its weight but also by helping to hold it in position."

Because of its nocturnal habits, it is not easy to make regular observations of the woodcock, and the documentation of its carrying behavior is difficult. In the meantime, the controversy is exciting to wildlife enthusiasts who hope to witness its interesting behavior and record it on film.

Woodcock habits

John Couch, in his letter to the Canadian Wildlife Service (see reference, above) regarding woodcock wings he and his partner, Raymond Blain, had provided for research and management, gave some interesting information on woodcock habits in his area:

"The North American woodcock is a very much smaller bird than the European woodcock. It seems to be almost gregarious in comparison with its European cousin. Whilst this must have something to do with their feeding requirements, it seems that on their migratory routes south they call and build up in numbers at only certain calling spots.

"We have certain spots south of Montreal where the birds collect in October. These are where you have young alders and black soil. The soil contains a green-colored earthworm. Birds shot in the morning have these in their crops. Woodcock migrating in Quebec do not seem to have an evening flight in the same way as do birds in New Brunswick where they regularly fly into alder and poplar swales.

"Years of observation now point out that woodcock migrate on clear nights only, and in overcast conditions they move very little. It is now almost possible to forecast what a day's hunting will produce in October in view of the night conditions of the preceeding two days. It is indeed almost with certainty that we can forecast where birds will be in view of the preceeding weather during the night.

"It may be of interest to you to know that in the city of Dorval and in Lasalle there are two areas of secondary poplar growth and black soil where a large number of woodcock harbor every fall and breed every summer. It is not possible to shoot in these areas but the birds are within yards of extremely heavy traffic and do not appear in the least disturbed. It is interesting to watch the evening mating flights over the roadways in April."

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Nuisance Beaver

Property owners often welcome the presence of beaver but when flooding occurs, usually in the spring, the novelty wears off quickly. Nothing is more futile than trying to discourage beaver by removing their dam. It will be endlessly rebuilt, seemingly overnight. Landowners should also be aware that they may be responsible for damage on adjoining property. While nuisance beaver are primarily the responsibility of the person on whose land they reside, each township in this District has an appointed nuisance beaver trapper. He will look after problems reported to this office during the open season for beaver when the pelts are of value. These trappers are experienced and might be of assistance to the landowner in the removal of problem beaver during the off season as well. *—Owen Sound District*

LETTERS IN REVIEW

Readers of 'Review'
are invited to set forth
their views in these columns

A vote for salmon

In Vol. 17, No. 1, the editorial, ''A Problem with Salmon,'' left out a few pertinent facts on the fishery in western Lake Ontario.

First of all, it failed to mention the cooperation between the Great Lakes Anglers' Association, the Ministry of Natural Resources, the City of Mississauga, the Credit Valley Conservation Authority and the Peel Regional Police who made up the Credit River Access Committee. This group has been instrumental in re-opening parts of the lower Credit River to fall fishing on an experimental basis, along with improving angler facilities and, hopefully, angler-landowner relations.

The success or failure of this experimental opening will, of course, not only determine future angling opportunities for salmon on the lower Credit, but also for rainbow trout.

It must be remembered that a large influx of rainbow trout in the river will cause as many, if not more, problems as the salmon have. The trout will not only enter the river in the fall and early winter months but also during their spring spawning run, and unless the anglers can be accommodated through better public access facilities along the Credit River, plus effective law enforcement, problems are sure to arise over this highly desirable species.

If the river salmon fishery cannot be utilized and controlled, neither can a rainbow trout fishery. Unlike the salmon, rainbow trout provide very few angling opportunities in the lake, itself. They are mainly aimed at a river fishery, and herein lies the problem of creating such a fishery in an urban area like Port Credit. Just witness the Thornbury mob scene on the Review's cover.

With regards to Pacific salmon, the experimental stockings in Twelve Mile and Appleby Creeks, both of which provide no upstream access to returning salmonids, will be watched closely by everyone involved in the salmon program. Salmon can be induced to return to the stocking sites and should provide a dynamic offshore fishery without the problems associated with the river aspect of their life cycle. In this venture, I wish the Ministry success.

The plans to re-habilitate a lake trout fishery in Lake Ontario are equally admirable but perhaps overly optimistic. There is no way that anglers will ever accept these fish as a replacement for the Pacific salmon. Lake trout are not exciting fighters; they grow slower; and will be highly susceptible to accumulating excessive amounts of chemical contaminants, which will make them even more risky to eat than salmon.

However, as an addition to a diversified fishery in Lake Ontario, they will probably be a welcome addition for summer anglers; but never a replacement for the highly successful salmon program.

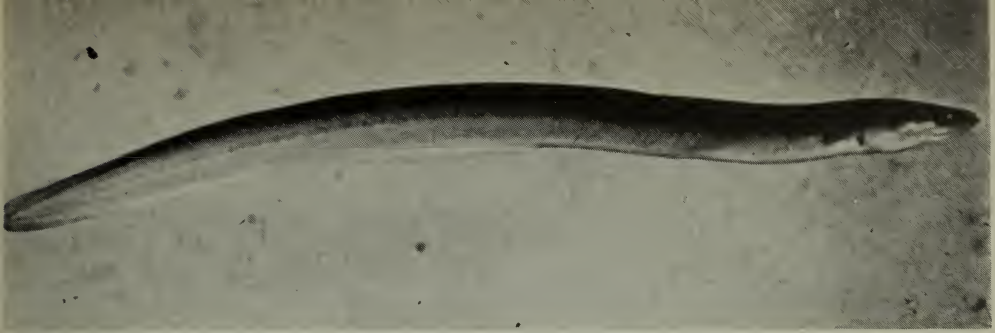
John Kerr
Member, Outdoor Writers of Canada
Member, Association of Great Lakes
Outdoor Writers

Ancient fly-fishing

My gleanings of natural history have uncovered a reference suggesting the art of fly-fishing dates to at least the period of Macedonian influence which reached its zenith in the third and fourth centuries B.C. The following account was given by the Roman author Aelian (ca. A.D. 170-230):

''I have heard and can tell of a way of catching fish in Macedonia. (In) a river called the Astraeus (Axius) there are fishes of a speckled hue . . . Now these fish feed upon the flies of the country . . . which settle upon the stream . . . (Anglers) wrap the hook in scarlet wool, and to the wool they attach two feathers that grow beneath a cock's wattles . . . The fishing rod is six feet long, and so is the line. So they let down this lure . . . on the surface . . . and the fish attracted and excited by the color comes to meet it, and fancying from the beauty of the sight . . . opens wide his mouth, (and) is entangled with the hook.''

R. M. Alison,
Waterfowl Biologist
Wildlife Branch



Fishing for flavor—American eel

by C. R. Jorgensen
Biologist, Lake Nipissing Fisheries Assessment Unit

THE only species of eel found in Ontario is the American eel, *Anguilla rostrata,* which should not be confused with the sea lamprey. The American eel has a protruding lower jaw and the gape extends to below the eye or beyond. The dorsal, anal, and caudal fins are continuous, and the pelvic fins are absent. The color of adult eels is variable and Eules (1968) in his study of eel fisheries in eastern Canada has stated ". . . in response to changing illumination, eels can alter their skin coloration by pigment redistribution within hours."

Although males seldom exceed 61 cm (24 inches) in length, females may be from 76 to 102 cm long, and females with a length of 122 cm (48 inches) and a weight of 7.25 kg (16 pounds) have been recorded.

An air of mystery surrounds the eel. On attaining sexual maturity, it moves to the sea where it spawns but the exact location of the spawning site is unknown. In 1922, Joahnnes Schmidt published an account of the breeding places of the eel. He concluded that both the European eel and the American eel spawn in the southwest part of the North Atlantic. Schmidt showed that the smallest larvae occurred in the region east of the Bahamas and southwest of Bermuda in the Sargasso Sea. However, in 1964, Vladykov suggested that the spawning grounds of the American eel may be much farther south than previously thought. The adults are presumed to die after spawning.

In fresh water, eels lie buried in silty bottoms during the day. They are opportunistic carnivores, feeding mainly at night on a variety of fish and invertebrates.

The eel occurs in Lake Ontario and the Ottawa River drainage and is rare in Lakes Erie and Huron. It also occurs inland in many lakes, especially in lakes that can be reached by tributaries of Lake Ontario and the St. Lawrence River system. Eels are capable of travelling overland to reach land-locked lakes and have occasionally been taken in Lake Nipissing.

Eels are voracious and will take almost any living bait. Fishing should be done at night (when they are feeding) with the baited hook close to the bottom.

THE EEL COOKERY

In most European countries, smoked eel is considered a delicacy and the English like jellied eel.

Smoked Eel

Clean the eel as soon as possible after taking it from the water. Scale the fish and remove the entrails.

Cure the eel in a brine (6 gal. water, 4 lb. salt, 1½ lb. sugar and 1½ oz. potassium nitrate or saltpeter). Cloves, bay leaves, sage or pickling spices may be added to the brine at the rate of 4 oz. spice to 6 gal. brine.

Place eel in a large enameled earthenware or glass container so that they lie straight; cover with the brine. Weigh eel down enough to submerge, but not to pack tightly together. Allow fish to cure in a cool place (0 to 4°C) for 24 to 30 hours.

Remove eel from the curing brine, rinse thoroughly and allow the surface of the eel to dry for about one hour.

A serviceable smoke house or smoking chamber may be made from a large packing box. Remove the top and bottom. Hang the eel in the top by string run through the gills and tied over sticks laid across the open top.

Cover the top with a wet burlap sack.

Build a small fire in the centre of a cleared area and allow it to form a small bed of coals. Take care to keep the fire small and to prevent it from flaming up. Cover the coals with dry hardwood sawdust or chips to smoulder. Repeat at intervals as needed. Place the chamber with eel over the smudge fire and regulate the draft by raising or lowering one side of the chamber. Smoke the eel for 4 to 6 hours, gradually adding hot coals to the smoker to raise the temperature. The internal temperature of the eel must be raised to 81°C. This temperature must be maintained for at least 30 minutes. Insert a thermometer into the thickest part of the eel to make sure that it reaches this temperature.

When smoking is complete, remove the burlap sack and allow the fish to cool. Then wrap the eel in waxed paper or cellophane and refrigerate. Use smoked eel within 14 days after smoking.

To make a Danish delicacy, place strips of smoked eel fillet on buttered rye bread and place a little scrambled egg between fish strips.

Fried Eel with Creamed Potatoes

3 eels, skinned and cut into 3 inch pieces
Salt
1½ cups flour
2 eggs, beaten
1½ cups fine dry bread crumbs
1/3 cup butter
6 potatoes, peeled and cubed
¼ cup butter
¼ cup flour
2 cups milk
1 teaspoon salt
½ teaspoon grated lemon rind
2 tablespoons chopped parsley

Sprinkle eel with salt and let stand for 1 hour. Rinse and dry thoroughly. Roll eel pieces in 1½ cups flour, then in beaten egg, and then in bread crumbs. Melt 1/3 cup butter in a skillet. Fry eels, turning occasionally until golden brown and tender—about 20 minutes. Cook potatoes in boiling salted water until tender. Melt ¼ cup butter. Stir in ¼ cup flour. Add milk gradually. Cook over low flame, stirring constantly, until smooth and thick. Stir in salt, pepper, lemon rind. Pour sauce over potatoes. Place potatoes in heated serving dish and surround with fried eel. Sprinkle parsley over potatoes and eel.

Werner Christiansen's Singapore Eel

3 pounds fresh eels, cleaned and skinned
4 tablespoons curry powder, or more
1 cup chopped carrots
1 cup chopped celery
1 cup chopped mushrooms
1½ cups skinned, chopped fresh tomatoes
1½ teaspoons salt
¼ teaspoon freshly ground black pepper
½ cup water or fish stock, or more
1 cup dry white wine

Cut eels into 1½-inch pieces. Heat butter in deep kettle and stir in curry powder. Cook over medium heat 3 minutes, stirring constantly. Add carrots, celery, mushrooms, tomatoes, and stir thoroughly. Add eel, salt and pepper, water or fish stock, and white wine. Simmer, covered over low heat about 18 to 20 minutes, stirring occasionally. Check for moisture; if too thick, add a little more water or wine; if too thin, thicken with a little flour. Serve with fluffy dry rice.

Jellied Eel

Served as a main course with creamed potatoes (see fried eel with creamed potatoes) or on open-faced sandwiches, or as one of the dishes of the cold table.

2 eels, skinned and cut into 2 inch pieces
2 bay leaves
1 onion, sliced
4 peppercorns
6 cups water
2 tablespoons white or tarragon vinegar
2 envelopes unflavored gelatin
¼ cup water
2 tablespoons chopped parsley.

Combine eels, onion, bay leaves, peppercorns and water. Bring to a boil and simmer over low heat until eel is tender—about 20 minutes. Remove eel, strain and reserve stock. Cool eel and remove bones. Keep eel in large pieces. Add vinegar to fish stock. Soak gelatin in ¼ cup of cold water for 5 minutes. Heat fish stock and stir in gelatin. Cook over low heat until gelatin is completely dissolved. Pour 1 cup liquid into a rinsed 6-cup ring mold. Chill until firm. Place eel pieces in decorative design on gelatin and sprinkle parsley over fish. Pour remaining gelatin over fish. (If there is any stock left over, pour into small rinsed custard cups and serve with other salads). Chill eel mold until firm. Unmold and decorate with parsley sprigs.

Salmon fishing boats on Lake Ontario.—Photos by Erika Thimm

Lake Ontario Salmon Angler Survey

by D. P. Kolenosky
Supervisor, Lake Ontario Fisheries Assessment Unit

Please complete the following questionnaire before reading further

	Yes	No
(1) Are you a salmon angler?	☐	☐
(2) Did you fish for salmon in Lake Ontario off the Credit River or Bronte Creek in the fall of 1977?	☐	☐
(3) Did a Conservation Officer question you about your fishing activities?	☐	☐
(4) Have you ever wondered what all of these angler surveys prove?	☐	☐

If you answered yes to Question 3, you were one of the 1,200 fishermen interviewed during our Salmon Angler Survey in the fall of 1977. If you answered yes to Question 4, this article is for you; so read on.

The Pacific salmon in Lake Ontario have captured the attention of many an angler since the first spawning run in 1970. The number of salmon fishermen has increased every year and fishing derbies have become popular. Both coho and chinook salmon have been stocked in various tributary streams from Niagara River to Toronto. By the fall of 1977 the Ministry of Natural Resources was faced with many questions about the salmon program.

Creel Census

To find the answers to some of these questions, we conducted a creel census. It covered the fall salmon fisheries off shore from the Credit River and Bronte Creek for a 60-day period from August 15 to October 15, 1977. During this time, an estimated 38,800 fishing trips occurred with an average length of slightly less than three hours. The total fishing pressure of 113,000 hours was evenly split between the two areas.

Many fishermen would like to know how long it takes to catch a fish or, indeed, to catch their limit. Only 9.6 hours were required to catch a salmon off the Credit while 18.5 hours were needed off the Bronte. Coho formed 96 per cent of the catch off the Credit and 83 per cent off the Bronte. The remainder of the catch were chinook.

The total harvest during the census period was estimated at 9,100 salmon, 3,200 from the Bronte area and 5,900 from the Credit. Coho averaged 10.7 pounds and chinook 23.0 pounds when weighed in at the Great Salmon Hunt derby in 1977. We can thus calculate that those 9,100 fish weighed more

A coho fresh from Lake Ontario.

than 100,000 pounds. Sports fishermen harvest more fish than most people realize.

Of the 1,200 anglers interviewed, 82.5 per cent came from within an hour's drive of the Credit and Bronte areas. Other Ontario residents made up 16.1 per cent while non-residents comprised only 1.4 per cent. The western Lake Ontario salmon fishery does indeed provide doorstep angling.

Angler Poll

Fishery managers want to know what anglers think about their fishing experience and what their preferences are. During the census, about 450 salmon anglers were asked six additional questions.

1. *How many days did you spend salmon fishing in Lake Ontario this year?*

Most salmon fishermen (68%) spend one to five days salmon fishing during the year. About 13 per cent are died-in-the-wool salmon anglers, spending more than 20 days a year at this sport. This latter group was most prevalent in the Bronte area and one might suspect they were after the elusive King, the chinook.

2. *Do you prefer to fish for coho or chinook?*

At both the Bronte and Credit areas, about 52 per cent of the anglers had no preference in salmon. Of the remainder, those who preferred coho were approximately equal in number to those who preferred chinook in the Credit area. However, at Bronte, the picture changes as twice as many of the remaining anglers preferred chinook over coho. This is not surprising as the place to go last fall for chinook was Bronte Creek.

3. *Have any of you fished for rainbow trout this year, and if so, for how many days?*

Nearly 56 per cent of the salmon anglers interviewed had not done any rainbow trout fishing during 1977. Of the remainder, about half were moderately active rainbow fishermen while the other half could be considered quite avid.

4. *Do you prefer to fish salmon or rainbow trout?*

Looking at the total picture, it appears that anglers have a slight preference for rainbow trout over salmon. In the Credit area, equal numbers of anglers (37%) preferred each type of fishing while most of the others (22%) showed no preference between the two. The Bronte area anglers, on the other hand, demonstrated some preference for rainbow trout fishing.

To determine whether this preference was related to the angler's past fishing experience, we combined the answers to Questions 3 and 4. Trout fishermen (56%) slightly outweighed non-trout fishermen (44%) among those anglers who said they preferred to fish for rainbow trout. Looking at the Bronte area by itself, however, these figures were reversed as 56% of those preferring rainbow trout had not done any rainbow trout fishing that year. Turning to the anglers who stated a preference for salmon, the majority (60%) did not fish for rainbow trout.

5. *Do you intend to eat the fish?*

Both coho and chinook salmon from Lake Ontario contain more contaminants than are considered safe for unrestricted eating. A warning was issued last summer to salmon anglers recommending that only occasional meals of these fish be eaten and that women of child-bearing age and children should not eat any at all. Many anglers (80%) intended to have an occasional salmon meal while only a small group (20%) were fishing just for fun.

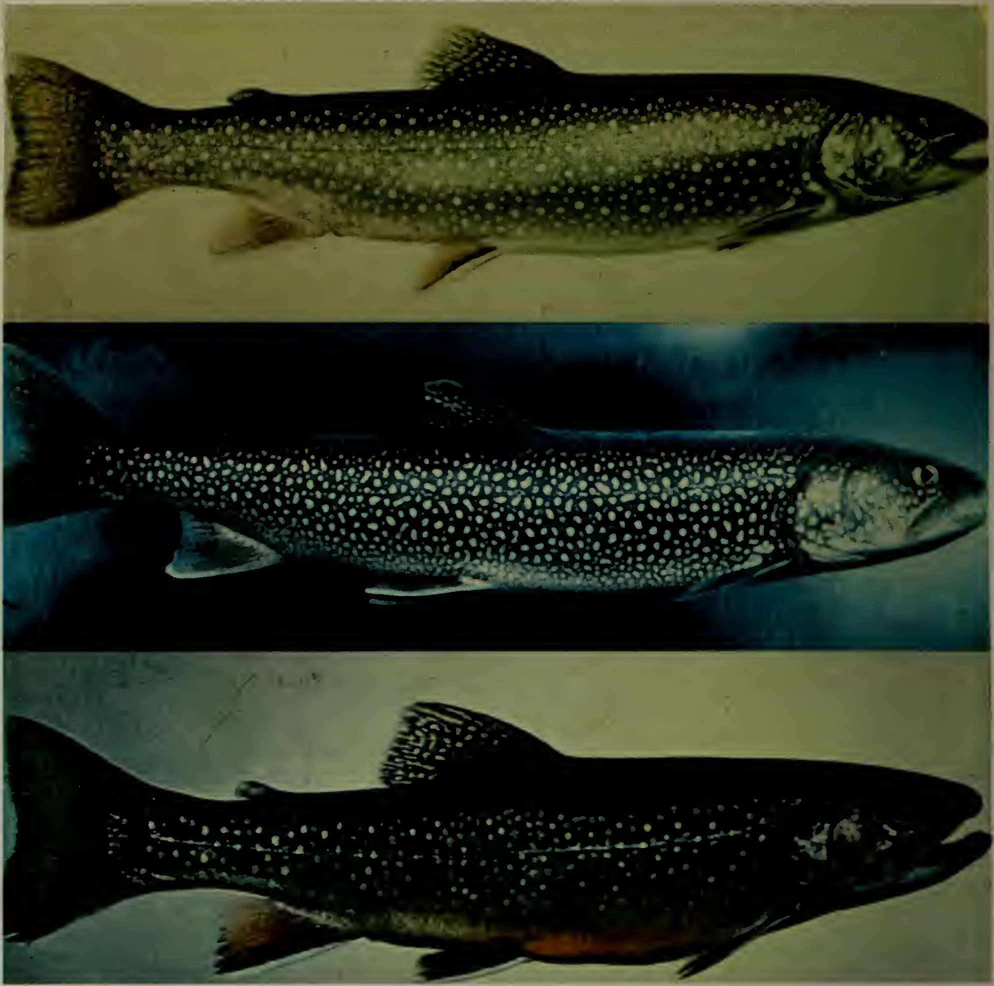
6. *Would you fish if there weren't a fishing derby?*

The advent of the Great Salmon Hunt has brought considerable attention and publicity to the annual salmon run in western Lake Ontario. Although some 1,700 anglers entered the derby, 89 per cent of the anglers interviewed in this survey said they would have gone salmon fishing even if there weren't a salmon derby. It thus appears that the fishing derbies are an interesting but secondary reason for fishing.

The coho salmon fishery in Lake Ontario represents the first sign of success in our efforts to restore the lake's fisheries to their earlier productiveness. With lamprey wounding greatly reduced and efforts being made to improve water quality, the stocking of naturally reproducing species such as lake trout and rainbow trout has begun. Until these fish provide a significant fishery, stocking of Pacific salmon will continue in the western basin of Lake Ontario.

Our thanks are extended to all the anglers who co-operated in this survey.

MERCURY
STARCRAFT
AMERICAN



Brook trout, top; splake, centre; and lake trout. Below: splake in spawning colors.